

SILICON-GERMANIUM THIN LAYER SEMICONDUCTOR STRUCTURE  
WITH VARIABLE SILICON-GERMANIUM COMPOSITION AND METHOD OF  
FABRICATION

ABSTRACT OF THE DISCLOSURE

A SiGe thin layer semiconductor structure containing a substrate having a dielectric layer, a variable composition  $\text{Si}_x\text{Ge}_{1-x}$  layer on dielectric layer, and a Si cap layer on the variable composition  $\text{Si}_x\text{Ge}_{1-x}$  layer. The variable composition  $\text{Si}_x\text{Ge}_{1-x}$  layer can contain a  $\text{Si}_x\text{Ge}_{1-x}$  layer with a graded Ge content or a plurality of  $\text{Si}_x\text{Ge}_{1-x}$  sub-layers each with different Ge content. In one embodiment of the invention, the SiGe thin layer semiconductor structure contains a semiconductor substrate having a dielectric layer, a Si-containing seed layer on the dielectric layer, a variable composition  $\text{Si}_x\text{Ge}_{1-x}$  layer on the seed layer, and a Si cap layer on the variable composition  $\text{Si}_x\text{Ge}_{1-x}$  layer. A method and processing tool for fabricating the SiGe thin layer semiconductor structure are also provided.